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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,706	10/02/2003	Christopher J. Vroman	200200034	9194

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EXAMINER

RUGGLES, JOHN S

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/677,706

Applicant(s)

VROMAN ET AL.

Examiner

John Ruggles

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/2/03, 1/20/04 & 5/10/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☒ Claim(s) 3,7,17 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/10/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because (1) the drawings include the following reference character(s) not mentioned in the description: (a) “22” shown in Figure 3 has not been found in the description thereof at page 8 lines 1-8 and (b) “78” shown in Figure 4 has not been found in the description thereof at page 8 lines 9-15; but (2) the drawings do not include the following reference sign(s) that are mentioned in the description: (a) “72” and “74” are not shown in Figure 3, even though these reference numbers are included with the description of Figure 3 at page 8 lines 5-6 and (b) “98” is not shown in Figure 4, even though it is included with the description thereof at page 8 line 11.

The drawings are also objected to because: (3) the description of Figure 3 found at page 8 line 8 states “the air gap formed by cutting surfaces 60, 68, 76 and 70”, but “60” in this list of cutting surfaces is described earlier at page 8 lines 1-2 as referring to the four-sided “frame” that is cut out from the flat sheet 62 and (4) the cutting surface “77” shown in Figure 3 has not been listed in the description thereof at page 8 line 8. Thus, it is believed that Applicants may have intended the above phrase found in the description of Figure 3 at page 8 line 8 to read --the air gap formed by cutting surfaces [[60,] 68, 76 ~~and 70~~ 70, and 77--, which is the interpretation used for the purpose of this Office action.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of

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an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms, which are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. Examples of some unclear, inexact or verbose terms used in the specification are: (1) at page 1 lines 28-29, "chamber must be purged of oxygen be being displaced with nitrogen" is grammatically incorrect and should be changed to --chamber must be purged of oxygen be by being displaced with nitrogen--; (2) at page 2 line 13, "fluctuations in temperature that occurs" should be corrected to --fluctuations in temperature that ~~occurs~~ occur--; and (3) at page 8 line 12, "nonporous to gas while surfaces 106, 108, 110 and 112 so that a frame is formed" should be changed to --nonporous to gas while surfaces 106, 108, 110 and 112 are porous to gas so that a frame is formed--. Note that due to the number of errors, those listed here are merely *examples* of the corrections needed and do *not* represent an exhaustive list thereof.

Appropriate correction is required. An amendment filed making all appropriate corrections must be accompanied by a statement that the amendment contains no new matter and also by a brief description specifically pointing out which portion of the original specification provides support for each of these corrections.

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The abstract of the disclosure is objected to because (1) it has more than 150 words; (2) at line 5, “fabricated into in such a way” should be changed to --fabricated ~~into~~ in such a way--; and (3) at lines 14-15, “It is possible to fabricate membrane in a variety of different” should be corrected to --It is possible to fabricate the membrane in a variety of different--. Correction is required. See MPEP § 608.01(b).

Claim Objections

Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim (claim 1). Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 3 fails to further limit claim 1 (on which claim 3 depends), because the range of “permeability between 1.0E^{-13} and $1.0\text{E}^{-11} \text{ m}^2$ ” recited in claim 3 does not further limit the specific and more limited “permeability of $3.5 \times 10^{-12} \text{ m}^2$ ” that is recited by claim 1.

Claim 17 is objected to because of the following informalities: the phrase “particles of about 0.003 microns or larger 8.3 sccm/cm^2 ” should be corrected to read --particles of about 0.003 microns or larger at 8.3 sccm/cm^2 --, in accordance with the specification at page 3 line 13. Appropriate correction is required.

It is also suggested that (1) claim 7 (which recites “starting powders where 90% fall between 2 and **26** microns”, emphasis added) should be made dependent on claim 6 (which recites “starting powders where 90% fall between 2 and **36** microns”, emphasis added) rather than on claim 1, because the claim 7 recitation is clearly a further limitation of the claim 6

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recitation for the size range of starting powders and (2) in claim 24, the phrase "porosity between about 40 and about 65%" would be better stated as --porosity between about 40% and about 65%--.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In claim 1, the "permeability of $3.5 \times 10^{-12} \text{ m}^2$ " (emphasis added) does not have units which are comparable with those typically used for permeability of a porous article that specifies the volume per unit of time per cross-sectional area of the porous article, such as -- $\text{cm}^3/\text{sec}/\text{cm}^2$ -- (which can alternatively be expressed as -- $\text{cm}^3/(\text{sec} \cdot \text{cm}^2)$ --). Applicants are required to provide a clarification of this matter or correlation with art-accepted terminology so that a proper comparison with the prior art can be made. Applicant should be careful not to introduce any new matter into the disclosure (i.e., matter which is not supported by the disclosure as originally filed). Claims 2-24 depend on claim 1.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3 and 6-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "the membrane" in each of claims 3 and 6-8 lacks proper antecedent basis. Each of claims 3 and 6-8 directly depend on independent claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller et al. (US Patent 5,814,272) and Zeller (US Patent 5,487,771) in view of Applicants' admission of prior art, further in view of Davis (US Patent 5,114,447), further in view of Ivaldi (US Patent 6,507,390), and further in view of Kuo (US Patent 5,814,381).

Zeller et al. '272 teach a process of forming a sintered article (e.g., a porous metal membrane gas filter element or porous media for a wide variety of applications, including semiconductor manufacturing, col. 1 lines 55-61, instant claim 2) from dendritic metal powder (e.g., commercially available metal nickel (Ni), iron (Fe), or an alloy of 2 or more metals, etc., such as an alloy of Fe and Ni, col. 1 lines 14-17 and col. 2 lines 32-35, which reads on the instant INVAR alloy of 64% Fe and 36% Ni that Applicants admit at instant page 2 lines 30-31 has been

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known as prior art and available for years as a material having a low coefficient of thermal expansion (CTE), instant claim 4). The porous media is formed from starting powder of any size, but is preferably formed from a powder having a size less than or equal to 10 microns (col. 5 lines 55-57, instant claims 6-8) that is processed by a method including sifting of the powder through a screen, sintering, braking up the resulting mass, and sintering it again (col. 2 lines 7-35) to achieve a wider particle size distribution. See Figure 1, showing starting powder distributed mostly between 2-5 microns, which is increased to a range of less than 5 microns to greater than 30 microns after sintering and also see Figure 5, showing a majority of starting powder distributed within a range of 3-15 microns, which is increased to a range having the majority of powder larger than 20 microns after sintering (instant claims 6-8). The resulting porous media has a sintered porosity of 60% or 61% (see Examples 1 and 2, col. 7 line 34 to col. 8 line 27, instant claim 5).

Zeller '771 teaches a high-porosity metallic membrane gas filter element made by sintering metal alloy particles at conditions to obtain porosities of greater than 55% (abstract) and shows specific examples in the range of 42%-75% for final porosities (Table 1 in Example 3, col. 10 lines 20-35), while prior art filters are described to have porosities of 40-44% (col. 2 line 15). Figure 6 correlates final porosities of 42%-75% (encompassing the instant claim 5 porosity range of 40-65%) to permeabilities of about 1 slpm/psi to about 6.2 slpm/psi, which would inherently be expected to encompass the instant permeabilities (in the range of 1.0 E^{-13} to $1.0 \text{ E}^{-11} \text{ m}^2$, including $3.5 \times 10^{-12} \text{ m}^2$, of instant claims 1 and 3), because the instant porous media is expressly described at instant page 4 lines 25-28 to be produced in the same manner as set forth

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in the later Zeller et al. '272 patent; which further indicates use at column 6 lines 26-30 of the same starting materials as this prior Zeller '771 patent.

Zeller '771 and Zeller et al. '272 in view of Applicants' admitted prior art do not specifically teach all the limitations of instant claims 1-24.

Davis teaches an ultra-high efficiency porous particulate air filter for use in the microelectronics manufacturing industry that is formed as a fully homogeneous sintered metal filter (porous media) exhibiting an efficiency substantially in excess of a 6 log reduction and preferably equal to or greater than a 9 log reduction (for an efficiency of 99.9999999%, abstract, reading on instant claims 1 and 17). The porous sintered metal disk filter is made from very fine powdered material (i.e., having a mean particle size well below 20 microns and preferably about 10 microns or less, e.g., of a Ni metal alloy, etc., col. 5 lines 26-40, reading on instant claims 6-8).

Ivaldi teaches an apparatus mask assembly having a porous metal frame 206 (made from sintered metal particles having pores sized from sub-micron to plural microns each, as controlled by sintering) between a reticle (mask) 104 and a glass pellicle 108 (col. 5 lines 5-31, instant claims 9-11, 14, and 18-24).

Kuo teaches a pellicle assembly having a vented frame 14 (for protecting a mask or reticle from particulate contamination, title, abstract, col. 1 lines 5-8). The shape of the vented frame can be rectangular, which includes square, or alternatively circular, oval, or polygonal, having rounded corners, etc. (that also includes a shape having 2 or more walls joined by elbow joints, instant claims 10-13, 15, and 16) and is preferably formed of a substantially rigid material such as metal (Figures 1 and 7-8, col. 3 lines 63-67).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to have used a porous sintered metal powder media (frame) having a lower CTE when made from INVAR (Ni metal alloy having 64% Fe and 36% Ni) for a porous (filter) media frame as taught by Zeller '771, Zeller et al. '272, and Davis (further in view of Applicants' admitted prior art) in the mask assembly optical apparatus taught by Ivaldi in order to obtain a better match of CTE between the frame and mask or pellicle. A porous sintered metal (filter) media of INVAR would be expected to inherently possess the various properties recited by the instant claims, including the high efficiency filtering properties taught by Davis. Alternative equivalent shapes for the porous sintered metal powder media frame include those taught by Kuo, at least because Kuo relates to the same art of mask assembly optical apparatus as the combination of Zeller '771, Zeller et al. '272, Davis, and Ivaldi.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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